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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/671,740	09/29/2000	Mitsuhiro Shibasaki	000635	2061

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EXAMINER

CHANG, SUNRAY

ART UNIT

PAPER NUMBER

2128

DATE MAILED: 06/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/671,740

Applicant(s)

SHIBAZAKI, MITSUHIRO

Examiner

Sunray Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION*****Specification***

1. The abstract of the Disclosure is objected to since the current abstract is not a brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. [see MPEP § 608.01(a)]

***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. **Claims 1 – 10 are rejected under 35 U.S.C. 101** because *claims 1 – 10 are drawn to a method or an apparatus for determining a regular N-polygon figure having vertexes of N in number. It is mathematical algorithm.*

An invention which is eligible for patenting under 35 U.S.C. § 101 is in the “useful arts” when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. The fundamental test for patent eligibility is thus to determine whether the claimed invention produces a “**useful, concrete and tangible result.**” The test for practical application as applied by the examiner involves the determination of the following factors:

(1) “Useful” – The Supreme Court in *Diamond v. Diehr* requires that the examiner look at the claimed invention as a whole and compare any asserted

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utility with the claimed invention to determine whether the asserted utility is accomplished.

(2) "Tangible" – Applying *In re Warmerdam*, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994), the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. If so, the claim involves no more than a manipulation of an abstract idea and therefore, is nonstatutory under 35 U.S.C. § 101. In *Warmerdam* the abstract idea of a data structure became capable of producing a useful result when it was fixed in a tangible medium which enabled its functionality to be realized.

(3) "Concrete" – Another consideration is whether the invention produces a "concrete" result. Usually, this question arises when a result cannot be assured. An appropriate rejection under 35 U.S.C. § 101 should be accompanied by a lack of enablement rejection, because the invention cannot operate as intended without undue experimentation.

The examiner respectfully submits, under current PTO practice, that the claimed invention does not recite either a useful, concrete, or tangible result and is merely drawn to a mathematical algorithm.

- The claimed invention is not tangible. The claims merely recite an algorithm.
- Further, in accordance with the Federal Circuit decision of *State Street Bank v. Signature Financial Groups*, 47USPQ2D1596 (Fed Cir 1998), a claimed invention must be directed to the technical

arts. It is considered that the currently claimed invention is not directed to technology since only a mathematical algorithm is being claimed.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 – 10 are rejected under 35 U.S.C. 102(b) as being anticipated by David P. Little (SpiroGraph, <http://www.math.dartmouth.edu/~dlittle/java/SpiroGraph/>, 1997, and referred to as Little hereinafter).

8. Regarding independent claims 1 – 10:

- Little teaches the center point (S) [origin, Line 18, Page 1] of a regular N – polygonal figure [Square in Fig. 1, Page 2] to be determined is set as a fixed point [origin, Line 18, Page 1]; a point  $[(R + r, 0)]$ , Line 20, Page 1], which is distant by a certain length  $[R + r]$ , Line 20, Page 1] from the said center point (S) [origin, Line 18, Page 1] and revolves around [large circuit in Fig. 1, Page 2] the center point (S) [origin, Line 18, Page 1], is set as a first point (E)  $[(R + r, 0)]$ , Line 20, Page 1]; a point [reflector, Line 22, Page 1], which is distant by a certain length

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[Distance of Point, Line 22, Page 1] from the first point (E)  $[(R + r, 0)$ , Line 20, Page 1] and revolves around [small circuit in Fig. 1, Page 2] the first point (E)  $[(R + r, 0)$ , Line 20, Page 1], is set as a second point (M) [reflector, Line 22, Page 1];

- Further, Little teaches the second point (M) revolves around the first point (E) at an angular velocity  $\omega$ , that the first point (E) revolves around the center point (S) at an angular velocity  $(1 - N) \omega$ , that the first point (E) is away from the center point (S) by a distance  $(r)$ , and that the second point (M) is away from the first point (E) by a distance  $(N - 1)^2 r$ , the locus of the second point (M) defines a contour of a regular  $N -$  polygonal figure to be determined being circumscribed on a circle having a radius  $N(N - 2) r$ .

By

$$X(t) = (R + r) \cos(t) - p \times \cos((R + r)t / r)$$

$$Y(t) = (R + r) \sin(t) - p \times \sin((R + r)t / r)$$

Multiplied by a constant angular velocity  $\omega$ 

$$\theta = \omega t$$

(Note: Functions <sup>S</sup> in the time domain are the same when written in the frequency domain and Official Notice is taken of this fact.)

We can get

$$X(\theta) = (R + r) \cos(\theta) - p \times \cos((R + r)\theta / r)$$

At  
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$$Y(\theta) = (R + r) \sin(\theta) - p \times \sin((R + r) \theta / r)$$

Base on

Second point (M) revolves around first point (E) at angular velocity  $\omega$

First point (E) is away from the center point (S) by a distance (r)

According to the value of  $k = 1 - N$  is a result of the initial value being set to  $2\pi - (2\pi / N)$  which is an arbitrary value. It is inherent for a person with ordinary skill in the art to get the same results as:

- Angular velocity of the first point (M) is  $(1 - N) \omega$  is constant.
- Second point (M) is away from first point (E) by distance  $(N - 1)^2 r$  which is derived from the initial value of  $2\pi - (2\pi / N)$ .
- The locus of the second point (M) defines a contour of a regular N – polygonal figure to be determined being circumscribed on a circle having radius  $N(N - 2) r$  which is derived from the initial value of  $2\pi - (2\pi / N)$ .

### **Conclusion**

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Morrell et al. (U.S. Patent No. 4,074,778) discloses a drilling tool with a center pole and a 1<sup>st</sup> pole revolving around center pole. Japanese Patent No. 6 – 304805, (1994) discloses a drilling tool and a drilling method. Aarnout Brombacher (Using Computers in Mathematics Instruction, 1997) discloses a Spirograph. Xah Lee (Hypotrochoid, 1998) discloses a

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Spirograph. Eric W. Weisstein (Spirograph, mathworld, 1999) discloses a Spirograph.

Varel, Sr. (U.S. Patent No. 4,763,736) discloses a roller cone bit. Hooker (U.S. Patent No. 4,114,486) discloses generating spherical surfaces, curve-selecting adjustable means, and rotation about its axis. Watt (U.S. Patent No. 4,333,368) discloses a spherical surface generating, along the locus of the radius, cutting tool tip, x-y coordinate machine. Pessier et al. (U.S. Patent No. 5,695,018) discloses bit rotation, a earth-boring bit, a cutter, and gage surface.

Hall et al. ( U.S. Patent No. 4,738,322) discloses roller cone rock bit, bearing system, polycrystalline diamond. Pessier et al. (U.S. Patent No. 5,996,713) discloses rock bit, cutter, spirals downwardly. Oliver Kerr (X2 Applied Mathematics 1998/1999, <http://www.city.ac.uk/mathematics/X2ApplMaths/index.html>, 09/11/1998) discloses Orbits of a planet around the sun, and angular velocity. Xah Lee (Coins of the Realm, [www.xahlee.org/SpecialPlaneCurves\\_dir/specialplaneCurves.html](http://www.xahlee.org/SpecialPlaneCurves_dir/specialplaneCurves.html), discloses epitrochoid, spiral, Hyperbola, and Hypocycloid.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sunray Chang whose telephone number is 703-305-8744. The examiner can normally be reached on M-F 7:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on 703-308-3179. The



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fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-746-3506.

  
Anthony Knight  
Supervisory Patent Examiner  
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U.S. Patent and Trademark Office

June 14, 2004